

tainly not lessened by current advance, for Boas has lately shown most conclusively¹ that the pulmonary artery is homologous throughout the vertebrate series.

2. Palæontological Contributions to Selachian Morphology.

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I. *On the Lateral Line of a Cretaceous Species of Scylliidae.*

It has long been known that the canal investing the sense-organs of the "lateral line" in Selachian fishes attains, as a rule, to a considerably higher stage of development than in the Chimæroids. While in the latter the canal is merely an open groove, supported by a series of incomplete ring-like dermal calcifications, in the former it assumes a tubular character, opening externally by a row of small orifices, either in its own roof, or through short secondarily developed diverticula.

Only two undoubted exceptions to this rule appear to have hitherto been placed on record. The living *Echinorhinus* is shown by Solger² to have the lateral line in the form of an open groove, though this apparently is not supported by any minute calcifications; and very similar is the lateral line of *Chlamydoselachus*, as described by Garman³. The supposed Liassic Selachian, *Squaloraja*, may also be assumed to have exhibited a similar condition of this organ, the small half-rings originally supporting it being very clearly seen in several fossils recently described before this Society⁴, and agreeing in every respect with those met with in *Ischyodus* and *Chimæra*. Both of the first-named genera, however, are of a comparatively primitive character, and *Squaloraja* shows several other marks of resemblance to the Chimæroids, so that the fact is not unexpected. But I have lately observed suggestive traces of a similarly embryonic lateral line in a most specialized modern type of Selachian; and as this appears to be an unlooked-for novelty, it may be deemed worthy of a brief note.

The Shark in question is a small fossil species, discovered in the Upper Cretaceous strata of Mount Lebanon, Syria, and provisionally assigned by Pictet and Humbert⁵ to the genus *Scyllium*, under the

¹ "Ueb. d. Arterien bogen der Wirbelthiere," Morphol. Jahrb. vol. xiii. 1887, p. 115. See also *ibid.* vol. vii. p. 488, and vol. viii. p. 169.

² B. Solger, 'Nene Untersuchungen zur Anatomie der Seitenorgane der Fische,' Archiv mikr. Anat. vol. xvii. (1880), p. 96.

³ S. Garman, '*Chlamydoselachus anguineus*, Garm., a living species of Cladodont Shark,' Bull. Mus. Comp. Zool. Harvard Coll. vol. xii. no. 1 (1885), p. 3.

⁴ Smith Woodward, 'Note on the Lateral Line of *Squaloraja*,' P. Z. S. 1887, p. 481.

⁵ F. J. Pictet et A. Humbert, 'Nouv. Rech. Poiss. Foss. Mont Liban,' p. 111, pl. xviii. figs. 2-4.

name *S. sahel-almæ*. It is an undoubted member of the Scylliidae; the vertebral centra are distinctly asterospondylic; the body is much depressed, so that all the fossils display either the dorsal or ventral aspect; the tail is very long; the teeth are of the ordinary type; and some other distinctive features are shown. In one respect, however, it seems to differ from all known Scylliidae. It is destitute of dermal shagreen; and on this account the peculiarity to be here noted is very conspicuous in the impressions upon the limestone.

On either side of the trunk and tail, at a short distance from the vertebral column, there is a delicate longitudinal streak, which, upon close examination, is found to consist of a series of minute ringlets, in their crushed state overlapping one another. Though in some parts obscure, these are very distinctly shown to be incomplete half-rings, and they are thus precisely similar to those already described by Leydig in *Chimæra*, and by myself in *Squaloraja*. They occupy the position of the lateral line in the fossil, and they are of the usual proportions, so that there can be no doubt as to the correctness of their identification. They are especially evident in one specimen in the British Museum, numbered 48107; but neither in this, nor in any other, have I observed an extension of the rings upon the cephalic region, a circumstance perhaps indicating that, as in *Chimæra*, the groove of the lateral line was partially closed in its anterior portion.

Whatever may be the significance of the facts just detailed, they are worthy the attention of biologists having the opportunity of examining the anatomy of recent Selachians. It is quite possible that the supports of the lateral line of *Scyllium sahel-almæ* are a surviving mark of affinity with the Chimæroids; it is equally possible that they may relate only to analogous mechanical contingencies. Further observations upon the characters of the "lateral-line" structures in Selachians with naked skins are much to be desired.

II. On the Pelvic Cartilage of *Cyclobatis*.

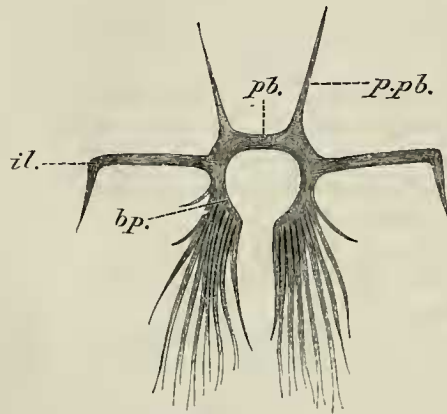
One of the most remarkable endoskeletal structures presented for consideration among extinct Selachians, is the pelvic cartilage of a small Sting-Ray (*Cyclobatis*), from the prolific Cretaceous fish-beds of Mount Lebanon. This does not appear to have been hitherto correctly interpreted, and as it may eventually prove to have a not unimportant bearing upon certain theoretical considerations, a brief description and separate figure will doubtless be acceptable to biologists. The fish was originally described as a fossil Torpedo by Egerton¹, but I have lately determined that it is almost certainly referable to the Trygonidae².

As shown in the accompanying woodcut (p. 128) the transverse

¹ Sir P. Egerton, "Description of a Fossil Ray from Mount Lebanon (*Cyclobatis oligodactylus*)," Proc. Geol. Soc. vol. iv. pp. 442-446, pl. v.

² Smith Woodward, "Note on the Affinities of the so-called 'Torpedo' from the Cretaceous of Mount Lebanon," Geol. Mag. [3] vol. iv. 1887, pp. 508-510.

pubic cartilage in its median portion is straight and narrow, but becomes slightly broader and is angularly bent backwards at about one fourth of its total length from either extremity. From each angulation in front there projects forward a very long tapering pre-pubic process, rightly interpreted as such by Sir Philip Egerton in his original description of the fossil; and immediately in advance of the point of attachment of the basal cartilage of the pelvic fin on each side another larger process is seen to extend laterally. This is almost or quite as broad as the median portion of the pubic cartilage itself, and is directed outwards, without apparent tapering, to a distance equal to the entire transverse extent of the complete pubic element, when it bends backwards almost at right angles, and is half



Pelvic cartilage of *Cyclobatis oligodactylus*, from the Chalk of Mount Lebanon, Syria. *bp.*, basal cartilage of pelvic fin; *il.*, iliac process; *pb.*, pubic cartilage; *p.pb.*, prepubic process.

as long again, though rapidly narrowed to a point. This remarkable process was described by Egerton as the "proximal digit" of the pelvic fin, while Mr. J. W. Davis has recently³ hazarded the suggestion that it "may have been the basal portion of a clasper." As, however, no sutural line can be observed at the origin of the cartilage, and as it is sometimes seen to be *dorsally* placed with respect to the other structures, there cannot be much doubt that it is the homologue of the well-known process named the iliac.

The enormous proportions of these processes in *Cyclobatis* appears at present inexplicable, the prepubic equalling no less than one sixth the entire length of the disk. No known Selachian, so far as I am aware, exhibits pelvic-arch processes of equal relative size, and in the living *Trygon* these are comparatively insignificant or absent².

¹ J. W. Davis, "Fossil Fishes of Chalk of Mount Lebanon," Trans. Roy. Dublin Soc. [2], vol. iii. 1887, p. 492.

² In the figure of the skeleton of *Trygon* given by Agassiz ('Rech. Poiss. Foss.' vol. iii. pl. II. fig. 1), a large ascending process is shown connecting the pelvic cartilage with the vertebral column. This must be an artist's error.

Professor Howes, however, has suggested to me that the great iliac prominences may have supported the metapterygium of the pectoral fin in the same manner as the antorbital (post-palatine) cartilage is related to the propterygium. The reflected tapering extremities are certainly best explained upon this hypothesis; and although the crushing to which the fossils have been subjected prevents the possibility of decisive proof, I venture to adopt this interpretation of the structures as at present the most plausible.

3. List of Mammals obtained by Mr. G. F. Gaumer on Cozumel and Ruatan Islands, Gulf of Honduras. By
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Mr. Salvin has asked me to put on record the names of the Mammals collected by Mr. G. F. Gaumer, (1) on Cozumel Island, situated off the east coast of Yucatan in $20^{\circ} 30' N.$ lat.; and (2) on the Bay Islands—*i. e.*, Ruatan with its companion Bonacca, off the north coast of Honduras, $16^{\circ} 25' N.$ lat., and $86^{\circ} 25' W.$ long. The specimens have been presented to the Natural History Museum by Messrs. O. Salvin and F. D. Godman, for whom they were collected.

I. *Cozumel Island.*

1. *NASUA NASICA*, L.
2. *NYCTINOMUS GRACILIS*, Wagn.
3. *CHILONYCTERIS RUBIGINOSA*, Wagn.
4. *ARTIBEUS PERSPICILLATUS*, L.
5. *DIDELPHYS MARSUPIALIS*, L¹.

II. *Ruatan and Bonacca Islands.*

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| 1. <i>SACCOPTERYX BILINEATA</i> , Temm. | Ruatan. |
| 2. <i>MOLOSSUS OBSCURUS</i> , Geoffr. | Ruatan. |
| 3. <i>GLOSSOPHAGA SORICINA</i> , Pall. | Ruatan. |
| 4. <i>ARTIBEUS PERSPICILLATUS</i> , L. | Ruatan. |
| 5. <i>SIGMODON HISPIDUS</i> , S. & O. | Bonacca. |
| 6. <i>DASYPROCTA PUNCTATA</i> , Gray. | Ruatan. |

A squirrel from the Island of Meco, on the north coast of Yucatan, was also obtained, and proves to be referable to *Sciurus hypopyrrhus collicæi*, Rich.

¹ As will be shown elsewhere, I consider this name applicable to all the large, long-haired Opossums hitherto known as *D. virginiana*, *D. cancrivora*, *D. aurita*, &c.